



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/092,977	03/07/2002	Yu-Chih Lai	67,200-708	6093
7590	05/05/2004		EXAMINER	
TUNG & ASSOCIATES Suite 120 838 W. Long Lake Road Bloomfield Hills, MI 48302			HASSANZADEH, PARVIZ	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/092,977	LAI ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Parviz Hassanzadeh	1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
 THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 3/24/04.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-10 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-10 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 07 March 2002 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                     | Paper No(s)/Mail Date. _____ .  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____ .                                  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election of Group I, method, in Paper No. 3/24/04 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 11-17 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected apparatus, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 3/24/04. It is also noted that claims 11-17 have been canceled by the Applicants in the paper number 3/24/04.

### ***Specification***

The disclosure is objected to because of the following informalities:

on page 11, line 7, it is suggested to change 14 to 15;

on page 15, line 8, it is suggested to change 40 to 70.

Appropriate correction is required.

### ***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: in Fig. 1, numerical label 12. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 1-3, 6, 7, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno et al (US Patent No. 6,129,046) in view of Yadav et al (US Patent Application Publication No. 2003/0026904 A1) and Marumo (JP 4-219953-A).**

Mizuno et al teach an apparatus (Fig. 4) and a method of plasma processing such as plasma etching of a wafer 114 placed on a support member 115 wherein the substrate 114 is clamped onto the support member 115 by a differential pressure chuck , wherein pressure difference is produced by exhausting air in an annular groove 126 and radial grooves 127 using a differential pressure chuck exhaust mechanism 124 (column 1, line 43 through column 2, line 16).

Mizuno et al fail to teach determining a differential pressure gradient between the front side and the back side of the substrate.

Yadav et al teach a semiconductor processing apparatus (Fig. 2A) including a differential pressure chuck 135 wherein the pressure at the front and back surface of the substrate placed on

the upper surface of a support plate 20 is measured by pressure sensors 166 and 168 and communicated with a controller 170 so that the vacuum pressure at the back and front surface of the substrate can be controlled throttle valves 162 and 164 (paragraphs 0047-0051).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the pressure control mechanism as taught by Yadav et al in the apparatus of Mizuno et al in order to control the pressure level on the back and front surface of the substrate.

Mizuno et al in view of Yadav et al fail to teach determining a differential pressure gradient in order to measure a position of the wafer on the substrate support.

Marumo teach a substrate delivery and processing apparatus (Fig. 1) wherein the pressure inside the chamber and the suction pressure of the substrate are detected respectively, and the state of the substrate is judged as being in a sucked state when the suction pressure of the substrate is less than a prescribed differential pressure according to the pressure inside the chamber (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Marumo in the method of using the apparatus of Mizuno et al in view of Yadav et al in order to judging the state of the position of the substrate on the differential pressure chuck.

*Further regarding claim 2:* the apparatus of Mizuno et al and Yadav et al each include a pump, exhaust mechanism 13 (Mizuno et al) and vacuum pump 158 (Yadav et al).

*Further regarding claim 3:* the apparatus of Yadav et al includes throttle valves 162 and 164.

*Further regarding claim 6:* the apparatus of Yadav et al includes a pressure sensor 168 to measure the pressure inside the process chamber.

*Further regarding claim 7:* It is held *in re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960) that a mere duplication of parts has no patentable significance unless a new and unexpected result is produced therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use more than one pressure sensor in order to further improve the accuracy of the pressure measurement.

*Further regarding claim 9:* Marumo teach a substrate delivery and processing apparatus (Fig. 1) wherein the pressure inside the chamber and the suction pressure of the substrate are detected respectively, and the substrate is judged to be in a sucked state when the suction pressure of the substrate is *less than a prescribed differential pressure* according to the pressure inside the chamber. The selection of the predetermined differential pressure gradient is considered a *result-effective variable parameter* that would have been obtainable through routine experimentation and optimization process. It is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Allen*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

*Further regarding claim 10:* the apparatus of Mizuno et al can be used in an etching method (column 1, lines 5-12).

**Claims 4, 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno et al (US Patent No. 6,129,046) in view of Yadav et al (US Patent Application Publication No. 2003/0026904 A1) and Marumo (JP 4-219953-A) as applied to claims 1-3, 6, 7, 9 and 10 above, and further in view of Sandhu et al (US Patent No. 5,344,792).**

Mizuno et al in view of Yadav et al and Marumo teach all limitations of the claims as discussed above except for an additional valve connected in series with the throttle valve between the process chamber ad the pump; and a pressure gauge between the process chamber and the pump.

Sandhu et al teach a process chamber (Fig. 1) including a exhaust mechanism including a pressure sensor 26, valve 30 and throttle valve 32 arranged between a process chamber and a pump 36 (column 5, line 16-31).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the pressure sensor and the additional valve as taught by Sandhu et al in the apparatus of Mizuno et al in view of Yadav et al and Marumo in order to be able to further control the rate of the vacuum of the process chamber.

*Further regarding claim 8:* the purge gas can be any of Ar, N<sub>2</sub> or He (Sandhu et al, Fig. 1, column 6, lines 39-50).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parviz Hassanzadeh whose telephone number is (571)272-1435. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571)272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1763

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*P. Hassanzadeh*  
Parviz Hassanzadeh  
Primary Examiner  
Art Unit 1763

April 30, 2004